WHAT IS CLAIMED IS:

1. A drive unit comprising:

a motor that can input/output motive power to/from a drive shaft;

a drive circuit that performs drive control of the motor;

a fuel cell that is connected to the drive circuit without the intervention of a voltage converter such that electric power can be output;

a charge/discharge portion that is connected to the fuel cell in parallel and to the drive circuit such that electric power can be output, and that has at least one capacitor whose voltage in a fully charged state is higher than an inter-open-terminal voltage of the fuel cell;

a diode that is installed between the fuel cell and the charge/discharge portion such that electric power can be output only in a direction from the fuel cell to the charge/discharge portion; and

a drive control portion that controls the drive circuit such that drive control of the motor is performed on the basis of required motive power to be transmitted to the drive shaft,

wherein

the drive circuit performs drive control of the motor through the output of electric power from the charge/discharge portion or the output of electric power from the charge/discharge portion and the fuel cell.

2. The drive unit according to claim 1, wherein

the fuel cell is connected such that electric power can be output to the drive circuit via the charge/discharge portion.

3. The drive unit according to claim 1, further comprising:

a voltage detection portion that detects an inter-terminal voltage of the charge/discharge portion,

wherein

the drive control portion controls the drive circuit in such a manner as to increase regenerative power produced through regenerative control of the motor if an inter-terminal voltage detected by the voltage detection portion during regenerative control of the motor is between an inter-open-terminal voltage of the fuel cell and a predetermined voltage lower than the inter-open-terminal voltage.

4. The drive unit according to claim 3, further comprising:

a braking force application portion that applies a braking force to the drive shaft through mechanical operation and that is drivingly controlled by the drive control portion,

wherein

if the required motive power to be transmitted to the drive shaft is a braking force, the drive control portion divides the required motive power into a first braking force that is to be produced through regenerative control of the motor and a second braking force that is to be produced by the braking force application portion, and controls the drive circuit and the braking force application portion such that the first braking force and the second braking force are applied to the drive shaft; and

the drive control portion then controls the drive circuit and the braking force application portion such that the first braking force increases if an inter-terminal voltage detected by the voltage detection portion during regenerative control of the motor is within a predetermined range including an inter-open-terminal voltage of the fuel cell.

5. The drive unit according to claim 1, further comprising:

a cut-off portion that can cut the fuel cell off from the drive circuit,

wherein

the drive control portion controls the cut-off portion such that the fuel cell is not cut off from the drive circuit when motive power is input to or output from the drive shaft by the motor.

6. The drive unit according to claim 5, wherein

the drive control portion controls the cut-off portion such that the fuel cell is not cut off from the drive circuit either when regenerative control of the motor is performed.

7. The drive unit according to claim 1, wherein

the charge/discharge portion is composed of a plurality of capacitors that are connected in parallel.

8. The drive unit according to claim 7, wherein

the charge/discharge portion has a connection switch for connecting or disconnecting at least one of the capacitors.

9. The drive unit according to claim 8, further comprising:

a voltage detection portion that detects an inter-terminal voltage of the charge/discharge portion,

wherein

the drive control portion controls the connection switch such that the at least one of the capacitors is disconnected if regenerative control of the motor is performed, and such that the at least one of the capacitors that has been disconnected is connected if an inter-terminal voltage detected by the voltage detection portion becomes higher than an inter-open-terminal voltage of the fuel cell by a predetermined voltage with the at least one of the capacitors having been disconnected.

10. A vehicle comprising the drive unit of claim 1, wherein

the drive shaft of the drive unit is mechanically connected to at least one of axles of the vehicle.

11. A method of controlling a drive unit having a motor that can input/output motive power to/from a drive shaft, a drive circuit that performs drive control of the motor, a fuel cell that outputs electric power to the drive circuit, a charge/discharge portion that is connected to the fuel cell in parallel and that outputs electric power to the drive circuit, a braking force application portion that applies a braking force to the drive shaft through mechanical operation, and a drive control portion that controls the drive circuit and the braking force application portion such that drive control of the motor is performed on the basis of required motive power to be transmitted to the drive shaft, comprising the steps of:

measuring electric power input to the drive circuit;

determining whether or not the required motive power to be transmitted to the drive shaft is a braking force; and

applying a braking force produced through regenerative control of the motor to the drive shaft as a force larger than a braking force produced by the braking force application portion if the required motive power is a braking force while the electric power is within a predetermined range.